# COAL MINING

January, 1959

Volume 36, No. 1

# There is ONE

## drill rig that is giving

### results like

# THESE

"**80% more hole** drilled by Reich 650 in shale and medium sandstone, than by another hydraulic powered rotary of same rated capacity."

"**3 other truck-mounted rotaries** drilled a total of 221 ft. of 5⅝ inch hole per hour — one crawler-mounted Reich 750 drilled 236 ft. of 6¼ inch hole per hour, and also *averaged 3,000 feet more per bit.*"*

"**Weighing 6½ tons less** than a crawler rotary that cost almost twice as much, Reich 650 drilled 7⅜ in. holes approximately as fast in hard tough sandstone."

"**Very hard rock,** Reich 650 with 6⅝ in down-the-hole hammer drilled at rate of 54 ft. per hour; other rig with 6 in hammer, 29 ft. per hour."

"**In hard sandstone** our 750 Reich averaged 57 ft. of 7⅜ in. hole per hour, 1 man operating. Our other drill of same rated capacity averaged 41 ft. of 6¼ in. hole per hour, 2 men operating."

"**38 ft. per hour** of 7⅜ in. hole drilled by our Reich 750 in hard dense blue sandstone — competitive drill of same rated capacity 18 ft. per hour, both truck-mounted."

(Full details of the above cases — and many more— sent on request)

**The REICH'S greater speed is BUILT IN:**

**Faster Stem Loading** of the Reich saves time on every hole. Drill stem is added in *seconds* (Compare stem loading).

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***Exactly Right Drilling Speed** in every material — the only hydraulic rotary with *infinitely variable drilling speed.* Much bigger production with far lower bit cost.

**Easiest Operation** with minimum levers—all controls actuated by hydraulic power. *A real one-man rig.*

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## for companies like THESE

**Ayrshire Collieries Corp.**
**Busby Coal Company**
**Central Penna. Quarry Stripping & Constr. Co.**
**Cleveland Cliffs Iron Co.**
**Dow Chemical Company**
**Hanna Coal Co.**
**Jones & Laughlin Steel Corp.**
**McCoy Coal Stripping Co.**
**Ohio River Collieries Co.**
**Oliver Iron Mining Co.**
**Peabody Coal Company**
**Raleigh Eagle Coal Company**
**Red Parrot Coal Company**
**Saxton Coal Corp.**
**Tasa Coal Company**
**U. S. Gypsum Company**
**U. S Steel Corporation**
**Utah Construction Company**
**Vecellio & Grogan**
**Warrior Constructors**
**Western Contracting Corp.**

**Also Foreign —**

**National Coal Board, Great Britain (43 drill rigs)**
**Atlas Consolidated Mining & Development Corp., Philippine Islands**
**etc., etc.**

**Above is a partial list of recent**
**REICH ORDERS and DELIVERIES**

Published monthly by Modern Mining Publishing Company. Publica tion Office—Advance Printing & Litho Co., Erie, Pa. Editorial and Executive Offices—Erie, Pa. Pittsburgh Offices—P. F. JASIK, Publisher, 4575 Country Club Drive, Pittsburgh 36, Pa. Price: In the United States, $3.00 year; all other countries $5.00. Single copy 25 cents. Entered as second class matter at the Post Office at Erie, Penna., under the act of March 3, 1879.

**STOCKPILING COAL** for the William Aloe Coal Co., this 1¼-yd. shovel gets its power from a Cat D8800 Engine. A D13000 powers a 1½-yd. shovel, also stockpiling coal.

**LOADING OUT COAL** in the operation of the William Aloe Coal Co., this 2½-yd. shovel is powered by a Caterpillar D337 (Series F) Turbocharged Engine.

# Standardize on CAT Diesel power for the tough mining jobs

A. J. Schmidt, Purchasing Agent of the William Aloe Coal Co. at Imperial, Pa., now relies on Caterpillar for 100% of his engine power requirements in coal loading operations

That's a sound move for *any* mine. When you're powered 100% with Cat Diesels, you're sure of dependable performance in *every* phase of your engine power requirements. Their reliability has been a by-word on punishing applications for more than 25 years, because they were built for the hard work. Today, as a result of constant development, these modern heavy-duty units are tougher and more efficient than ever.

One of the big reasons for the complete acceptance of the Caterpillar Engine is the fuel injection system. Here's how it provides profitable production:

1. Maintains loads for long periods without power drop.
2. Idles smoothly and runs steadily on all cylinders.
3. Handles variable loads with quick response.
4. Burns a wide variety of low-cost fuels without added maintenance costs.
5. Is free from frequent checks and adjustments.

For complete information about Cat Engines and Electric Sets see one of Beckwith Machinery Company's Engine Specialists. He knows your power requirements and we back your purchase with fast, efficient service and high quality factory parts. For original or replacement power—for honestly rated, certified power—give us a call!



**CAT INDUSTRIAL ENGINES** 10 sizes up to 650 HP (maximum output capacity). Most leading manufacturers can furnish machines with Cat Engines on request.

**CAT ELECTRIC SETS** 12 sets up to 350 KW (continuous duty) with the Cat Generator All Cat Electric Sets and Engines come with a notarized certificate of capacity.

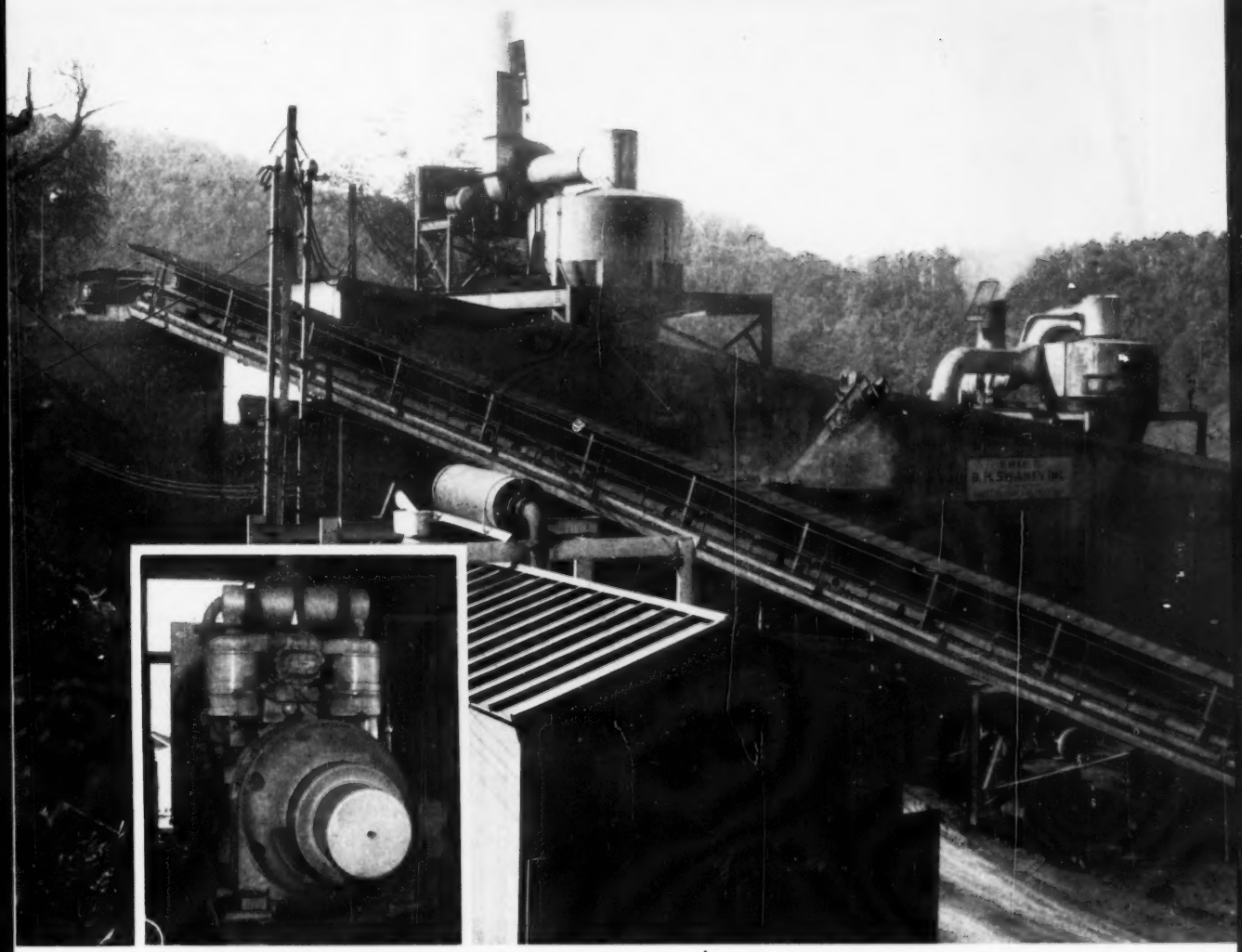
**ELECTRICAL POWER** for exhaust fan, pin timbering machine, shop cutting machine, loader, conveyor to tipple, grinder and lights at Overfield, West Va., is furnished by a D337 Turbocharged Electric Set. Production: 300 tons a day. Owner: R. & L. Coal Co.

**STRIPPING OVERBURDEN** from coal, this shovel with 5½-yd. bucket maintains profitable production powered by a Cat D397 (Series D) Turbocharged Engine. Owner: Keeley Construction Co., Clarksburg, West Virginia.

# FOR MORE PROFITS PER TON RELY ON CAT DIESEL POWER FROM BECKWITH

# ENGINE POWER

BY CATERPILLAR



**FURNISHING POWER FOR THE ENTIRE TIPPLE,** this Cat D397 Electric Set often starts Monday morning and doesn't shut down until Saturday night. Tipple consists of 2 crushers, 3 vibrators, 10 flight conveyors, furnace, air cleaner and washer. Production: 1,500 tons a day. Owner B. H. Swaney, Inc., Charlesburg, West Virginia.

Dept. CM, Engine Division
**BECKWITH MACHINERY CO., 6550 Hamilton Ave., Pittsburgh 6, Pa.**
Send me more information about Caterpillar Diesel Engines. I have checked the proper box to guide your selection of material.

☐ I would like detailed information, as I may be in the market for a Cat Diesel Engine or Electric Set. I understand that I am under no obligation.

☐ I am interested in learning more about these engines.

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CLARKSBURG, W.VA. • U.S. Rt. 20 • Phone Main 4-5476

6550 Hamilton Avenue • PITTSBURGH • Phone: MOntrose 1-6900

**New Williams 5 cubic yard dragline bucket gets a final check beffore shipping out of the Akron plant. Designed specifically for heavy-duty mining-type service, it features T-1 alloy steel construction.**

• A new group of heavy duty mining-type models is being added to its extensive line of dragline buckets by Williams Bucket Division of Wellman Engineering Company.

Built in 3, 4, and 5 cubic yard sizes, all buckets have arch and lip built from heat-treated T-1 steel for superior strength and wearing qualities. Chains are of heat-treated forged alloy steel.

The 3 cu-yd. model wheighs in at 6700 lbs. compared with the standard 3 cu-yd. Williams dragline which weighs 5875 lbs. The new 5 yard model weighs 11,000 lbs.

Other features of the standard line, including full-length patented welded stiffners, reversible manganese alloy steel teeth and adjustable hitch connections are all retained. All wear points are protected by skid bars and wear plates.

Over-all widths range from 6' 1" to 6' 9". Lengths of the new line range from 20' 4" for the 3-yard model to 28' 8" for the 5-yarder. for the 5-yarder. Like all Williams draglines, the new models are available perforated for wet service if desired.

For more information contact Williams Bucket Division, Wellman Engineering Company, 7000 Central Avenue, Cleveland.

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To assist owners in determining the cost of owning and operating equipment, Caterpillar Tractor Co. has prepared a special 24-page Monthly Time and Cost Record Book.

Twelve sets of pages are included on which to record, day by day, each month's individual machine expenses for an entire year. At the end of the record section is an annual summary sheet where the totals for each month can be entered to obtain annual cost figures.

Spaces are provided for recording both the quantity and cost of diesel fuel, gasoline, lubricating oil, grease filters, hydraulic oil, repair labor, and operator's time. Additionally, there is space for the type and amount of miscellaneous costs, such as transportation, tires, tire repair and other items. A "repairs column" allows ample room for recording repairs and costs. A machine hours worked" column allows the machine owner to record the actual hours the machine is operated. The "type of work" column provides space to classify the work done so that cost for different types of work can be compared.

At the end of each month the columns may be totaled to determine expenses for that particular month. To help compute owning and operating costs, a section at the back of the book explains simple methods of calculation.

In order to record expenses as they occur in the field, a pocket size Daily Time and Cost Record booklet is also available. This booklet can be used for recording time and expenses as they occur. Periodically, these figures may be transferred from the daily to the monthly cost record book.

Copies of the "Monthly Time and Cost Record Book", Form 33215, and "Daily Time and Cost Record Booklet," Form 32818-G, can be obtained at no cost from Caterpillar Dealers or by writing to the Advertising Division of Caterpillar Tractor Co., Peoria, Illinois. Requests for both publications should indicate title and form number.

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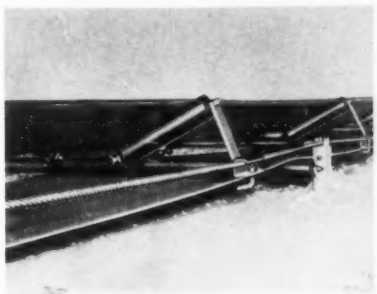
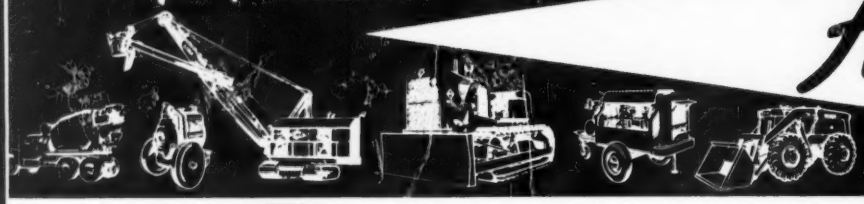


The New LO-ROPE conveyor manufactured by The Long Company, Oak Hill, W. Va. The rope on this conveyor is lower than the carrying idler and conveyor belt, thus idlers rock in direction of belt travel, providing automatic self-training for belt in both directions.

# For the best in all types of mining equipment...

# Highway



**A profitable suggestion... call your Highway representative!**

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Your Highway representative is a trained expert whose principal aim is helping you select the right equipment to speed your coal operations. Call him today and discover the many ways in which he can save you time and money!

Lima 2400... J. RUSSEL CRAVENER CO., Echo.

AA-8680

Highway

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Allis-Chalmers • Lima Shovels, Cranes, Draglines • Master • Thor Power-Pack Conveyors • Gar Wood • Lima Roadpackers Jaeger • Michigan Tractor Shovels and Excavator-Cranes

# Do You Know?

An all-time high enrollment of 3,258,556 full and part-time students in U. S. colleges and universities for the fall of 1958 has been reported.

This was the seventh consecutive year that new records were set for fall enrollments.

Enrollment for the fall of 1957 was 3,068,417 students. Thus, the 1958 enrollment exceeded the past year's by 190,139.

The 1958 enrollees included 2,110,426 men and 1,148,130 women. The survey includes all degree-credit students. These are students whose current program consists principally or wholly of work normally creditable toward at least a bachelor's degree.

* * * * *

Control of human evolution — if we want it — is actually within our grasp.

This is an example of the advances that have been made recently in human genetics, Dr. Bentley Glass of the Johns Hopkins University said. Human genetics has the difficulty of not being able to make experimental human test-crosses, but the science does have its advantages.

Concerning the future, Dr. Glass said it is safe to predict that great strides will be made in experimental population control by means of tissues culture genetics. The possibility of exposing tissue culture cells carrying some defective gene to DNA (deoxyribose nucleic acid) derived from normal individuals and thus restoring the defective cells is a "spectacular" concept.

The great advances already made in the artificial synthesis of bacterial DNA suggest many fascinating possibilities of producing a modifying human genetic material in the laboratory, Dr. Glass concluded.

In certain respects, Dr. Glass told a meeting of the University of Illinois Sigma Xi chapter, human genetics offers opportunities which cannot be derived from the study of plants, animals or microbes. The vast size of human populations and large amount of medical and anthropological information have made possible unforeseen advances in the study of man and his inheritable characteristics.

However, a great deal of work needs to be done in the field of mutations before we are able to estimate accurately the danger, for example, from subjecting the entire population to fallout, medical and diagnostic exposures to X-rays, or possible future exposures of all kinds. From studies of fruitflies and mice, it appears that some of our conceptions of the roles recessive and dominant genes play in affecting mutations must be revised, Dr. Glass explained.

# HERE AND THERE IN THE COAL INDUSTRY

● Southern Appalachian Coal Operators' Association releceted C. R. Griffith as president at the annual meeting Dec. 1, in Knoxville. Fred Loving, Jr., was named first vice president and P. B. C. Smith was reelected second vice president. H. S. Homan was reelected executive secretary and treasurer. In addition to Messrs. Griffith, Loving, Smith, and Homan, directors elected were Lindsay Young, R. H. Hughes, Ray S. Walker, Warren Haydon, E. F. Wright, C. J. Potter, W. T. Ray, and D. R. Christian.

* * *

● W. H. Parker has been reelected president of the Alabama Mining Institute. H. P. Sibert was reelected secretary-treasurer; H. F. DeBardeleben, vice president, and Fred Koenig was named vice president to succeed Phil Neal, who resigned. Elected to the board of governors were H. F. DeBardeleben, Milton H. Fies, R. E. Garrett, A. R. Long, Sr., Ben H. McCrackin, P. H. Neal, David Roberts III, and J. E. Urquhart. Hugh Morrow was elected a director emeritus of the Institute, having retired from active participation in business. Mr. Morrow participated in the first meeting of the Institute, when it was the Alabama Coal Operators Association, in August 1908, at the Association's formation.

* * *

● Appointment of D. R. Dunham as manager of the Columbia-Southern Chemical Corporation coal mine at Midvale, Ohio, has been announced by J. E. Burrell, general manager of operations for the firm. Mr. Dunham succeeds the late Paul C. Beutel who died suddenly last month.

Prior to his appointment Mr. Dunham had served as chief engineer for Columbia-Southern's Jersey City, New Jersey, plant since 1956. He joined Columbia-Southern at Barberton, Ohio, as an engineer in 1940 upon graduation from Ohio State University with a Bachelor of Science degree in civil engineering.

In 1950 Mr. Dunham transferred to Midvale on an engineering assignment and a year later was appointed chief engineer. He was named field and maintenance engineer for the Jersey City plant in 1955 and a year later was promoted to the chief engineer's position in which he served before returning to midvale this month. Mr. Dunham is a registered professional engineer of Ohio.

* * *

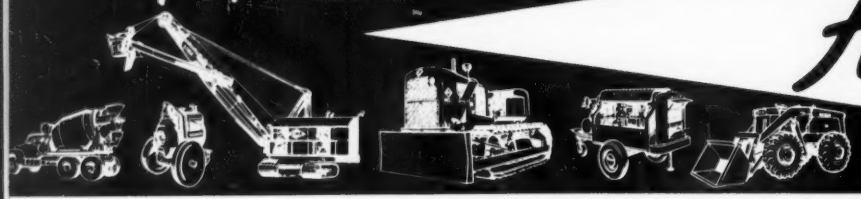
● Dr. H. J. Rose, vice president and consultant for Bituminous Coal Research, Inc., was awarded the 1958 Worcester Reed Warner Medal for outstanding contributions to engineering literature.

Presentation of the medal was made at the Annual Meeting of the American Society of Mechanical Engineers in New York City, in recogintion of Dr. Rose's "valuable work done in investigating and reporting the characteristics of coals, the beneficiation of coal by various processes, and the use and control of combustion by-products." A veteran of more than 40 years in coal and coke research, Dr. Rose is the author of morre than 90 technical papers and 28 United States and foreign patents relating to coal and coal utilization.

Prior to joining BCR in 1944 as vice president and director of research, Dr. Rose was vice president in charge of research of Anthracite Industries, Inc., and before that, he was assistant director of research of Koppers Company. During these positions, he was also associated with Mellon Institute on fuel research.

# For the best in all types of mining equipment...

# Highway



## All I need to know about mining equipment...

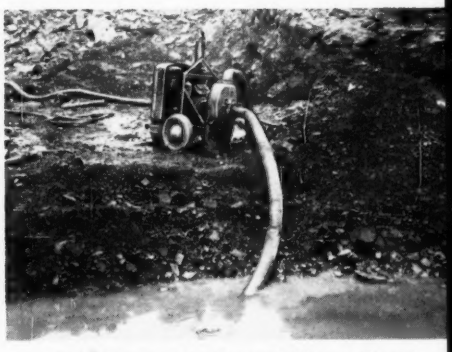
**Yes, like other leading operators, all I need to know about mining equipment is that it's *sold* and *serviced by Highway!***

**That's my guarantee that my work will start on time, continue steadily without interruption—and give me top profits.**

AA-7394

**Lima 2400 removing overburden for C & K Coal Co., near Parker, Pa.**

**Allis-Chalmers HD-21 spreading and compacting crushed stone in construction of haul road at Snyder Coal Co. strip job near Adrian, Pa. Tractor is also used for overburden removal and shelving.**



**Jaeger 6" Pump, with General Motors Diesel engine, solves water problem for C & K Coal Co. Water is pumped 45 ft. up cut and 120 ft. to point where it is expelled in gravity run area.**

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AA-8679

# Coal Mining Man Must Go Forward Or Perish

Man's uncertain, sporadic, plan of life forces changes in his living. "You cannot go back home." That is what every man learns, sooner or later, in his lifetime. Conditions back home are no longer as he knew them.

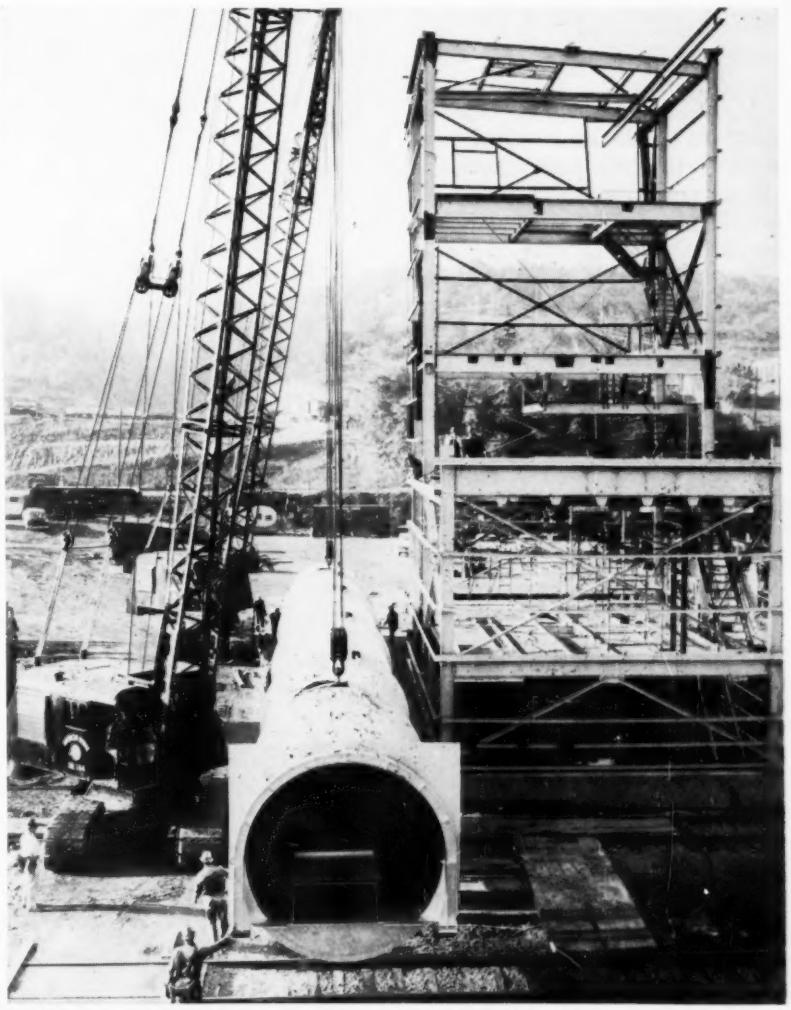
Man's evolutionary constructions are formulations of past history. Evolution in general, however, has no program. But, natural selection in the process of evolution, has promoted what was immediately useful. Natural selection has also made man trainable for diverse duties. Educability in man was consistently fostered by natural selection. Man is the sole product of evolution who knows that he has evolved and has continued to evolve.

Man must go forward or perish. Man can no longer rely on the slow process of natural evolutionary development. Man now has, however, a new and better instrument for survival called science. Through science, man is being advanced to greatness and splendor heretofore unknown. Science is making advanced steps in man's development and in his industry that will never be reversed.

Evolutionary records show that independence such as in America, with freedom to explore, particularly in industry, has been the essential condition of man's progress.

In the coal industry indicators have pointed, for some time now, to the fact that the kind of discovery and development needed to save it will have to come from the industry itself.

Like man must go forward or perish, the coal industry must go forward or perish. The coal industry has before it a mandate to progress, along with its competition, or lose its markets. The coal industry must discover newer methods of operation that will be immediately useful. To do that it must resort to frontier thinking and it must find ways of tapping hidden resources of mind and spirit of its best brains. It must lead its best brains to the necessary extraordinary performance required to discover and to develop that 'what is immediately useful."



**Readied to be hoisted into position, this 111-foot long belt conveyor tube will transport coal from the transfer house to the clean coal bin at U. S. Steel's new Maple Creek Mine's Coal Cleaning Plant in Washington County. Annual production of 500,000 tons of mine-run coal is expected to be attained by the end of 1959.**

# Conveyor Belt Installations in British Coal Mining

By LEO WALTER, M. Inst. of Fuel

● The use of conveyors in coal-mining by contractors employed by the British National Coal Board has greatly increased during recent years. In the following some interesting different types of conveyor installations will be described.

### Railway Embankment.

At Lea Hall Colliery, Rugeley, heavy earth moving jobs had to be carried out by the contractors, Sir Alfred McAlpine & Son Ltd., London, England. The work includes the building of railway embankment from a new colliery to an existing branch railway line some 4,800 feet distant, and the making of sidings. The general layout is for two navvies with capacities of 3¼ yard cube and 2½ yard cube to load continuously into a hopper. The material for the embankment is being dug by these navvies from a borrow pit which will eventually be filled in by mine refuse. (Fig. 1).

The material handled is in the nature of sand and gravel, and is dropped by the buckets into the hopper which has a small plate conveyor inside to take the impact, later loading onto the belt conveyors. It is then conveyed up to the top of the embankment by 42 inch Sutcliffe "Goliath" conveyors, powered by 60 h. p. motors advancing some 200 ft. per week. The embankment is 28 ft. high at the widest point and varies at the top between 33 ft. and 200 ft. wide.

Another point of interest is the swing jib employed here at the top of the main belt delivering on to the embankment. This can be turned to deliver either way, and hence while one side of the embankment is extending the conveyor, the other is filling (Fig. 2).

The following are facts relating to the scheme:

Total length of future embankment ..... 7,800 ft.
Advance per week average 200 ft.
Longest single conveyor 950 ft.
Navy bucket capacities 3¼ and 2½ yard cube
Highest point of bank .. 28 ft.
Width of bank top 33 ft. to 200 ft.
bottom 100 ft. to 250 ft.

Overall time — estimated to be 12 months
Total quantity to be handled over 900,000 tons
Belts used — 5 and 6 ply mainly

### Working Opencast Coal Site Kexborough

A new open-cast site was opened

Fig. 1 — Filling Hopper

Fig. 2 — Sutcliffe "Goliath" Conveyor in action.

up by the contractors, Messrs. Mears Bros. Ltd., at Kexborough, nearBarnsley, England, in 1950 on behalf of the British National Coal Board and is working since then. The earth moving equipment handled 19,000 cubic yards or 28,500 tons of overburden per week. It consisted of four 42 inch wide belt conveyors of Sutcliffe design, powered by 60 h. p. Goliath 6 inch driving heads, together with mobile hopper feeder, tripper and spreader conveyor. The story of this exploitation should be of interest to coal mining engineers dealing with stripping operations.

**Planning Use of Equipment**

Messrs. Richard Sutcliffe Ltd., of Wakefield, England, were entrusted with design and supply of the main mechanical handling equipment, and with working out a scheme in co-operation with engineers from the National Coal Board. A preliminary inspection revealed that this was an awkward site rising from the valley bottom of the River Dearne at an isolated point between the villages of Cawthorne and Kexborough, near Barnsley, well away from a power line. With this in mind, the original scheme provided for conveyors operated by individual diesel engines. The inflexibility of this arrangement finally resulted in the supply of a diesel operated generating station which generated power at 400/440 volts, 3 phase, 50 cycles, the driving units then being fitted with Trislot high-torque motors. The original scheme envisaged the use of a main loading conveyor straddled by two feed hoppers into which overburden could be loaded at a total rate of 300 tons per hour, the whole of this conveyor being mobile to suit the advancement of the excavation. From this unit the material was to be diverted at right angles by a second conveyor loading on to a third conveyor rising up the valley side to a section of the area reserved for tipping. The third unit had at its delivery end a travelling tripper or throw-off carriage delivering on to a 24 ft. long shuttle conveyor which could be rotated through 180 degrees and could thus deliver at either side or in advance of the main conveyor, thus forming a tip at a rising gradient which was later levelled off, upon which the main conveyor could extend as tipping proceeded. The whole of the system made use of 36 inch wide belts and was modelled upon the installation successfully used a little earlier at the Eastham Oil Dock site.

Further negotiation with the customer resulted in the scheme being amended as it was found that two draglines of 2½ to 3 cubic yard capacity could conveniently load in the one feed hopper and provide peak loads of 450 tons per hour. The scheme was therefore modified to incorporate 42 inch wide belts to cater for the increased output and one of the hoppers and its feeder was eliminated.

The installation finally consisted of a Peter-Brush diesel generator set of 600 B.H.P. to supply 3 phase current at 400/440 volts pressure on a 3 phase, 50 cycle system, complete with the necessary control panel distribution board, cables and a 110 volt transformer to provide single phase current for lighting purposes.

The output from the distribution board was controlled by individual skid mounted direct-on contractor type starters which for convenience and robustness sake were of the mining pattern with flameproof enclosures. Local control of these starters was by low-voltage, pilot operated, pushbutton stations. (Fig. 3).

The feed hopper was of massive construction, of such a size as to receive material freely distributed from a drag line bucket of 2½ to 3 cubic yard capacity, arranged to straddle the main 42 inch conveyor, running on double flanged wheels supported by standard flat bottom rails located from sleepers which in turn supported the framework of the conveyor.. The base of this hopper contained a heavy duty plate feeder, with overlapping plates supported on steel chains with hardened pins and bushes, the strength being commensurate with the need to accept stones of unspecified size and weight. This feeder was driven by a two speed reversible motor with a maximum output of 7½ H. P. to allow control of the rate of discharge on to the belt beneath. The reversing feature had been proved by previous experience to be necessary to allow clearing of the hopper mouthpiece when this became choked by an

**Fig. 3 — View of site showing stripping equipment and loading end of conveyor.**

accumulation of very large stones. The mouthpiece at each end of the hopper was of the order of about 4'.0" square, and the feeder was fixed at such a height above the belt line as to allow materials discharged from the rear of the feeder, when in reverse, to pass underneath the return strand of the feeder on the main conveyor belt. The base structure of the hopper also carried a travelling loading section which supported the main conveyor belt at such a height above its normal level, as to allow the hopper and loading section to travel freely along it without removing the idlers on the main conveyor structure. This loading section incorporated heavy duty impact idlers, having thick rubber of a special grade bonded to the outside of the standard steel shell, arranged in such a way as to deflect under impact from the falling material and thus to prevent belt damage or excessive idler wear. (Fig. 4).

The main conveyor which was 42 inches wide, 950 feet long, was driven by a standard Goliath Mark 6 driving head, already supplied in very large quantities to the mining industry. It incorporates a traction type fluid coupling connecting to the 60 h. p. Trislot motor, the framework being of standard mining type, except that in place of the usual pitching of idlers at 4 ft. 6 in. these were mounted at 3 ft. centers, that is, three per 9 ft. section. The tail end was of the fixed type held in position by Sylvesters while the delivery jib, or drum, was of the self supporting type fixed at such a level as to allow a clear discharge on to the succeeding conveyor. Behind the driving unit a loop take-up gear was installed to store 60 ft. of belt which allowed some tolerance over the final length of the conveyor and provided for stretch in the belt. Provision was made for keeping the belt by installing scrapers at strategic points and the belt was of 5 ply construction, 32 oz. duck, Grade B.1, i. e., War Grade corresponding to Grade B of B.S.S. 490 with rubber covers of 3/32 inch on to top side and 3/64 inch on the bottom.

The second conveyor receiving the discharge from No. 1 was identical in construction, except that its length was 700 ft. The third unit was again interchangeable with the two foregoing conveyors, being 300 ft. long except that being required to negotiate the gradient of 1 in 6.35 it was provided with a thruster operated electric mechanical brake to prevent the belt running back when stopped under load. This conveyor was also 300 ft. long as was the fourth conveyor which was interchangeable in toto with Conveyor No. 2. All four units had 60 H. P. motors. (Fig. 5).

The fourth conveyor being the one finally disposing of the overburden was supplied with a travelling tripper or throw-off carriage

Fig. 4 — Stripping Kexborough site.

Fig. 5 — Sutcliffe conveyors in operation.

running on flat bottom rails fitted to the sleepers supporting the conveyor structure, propulsion of the tripper being effected by means of a bevel gear drive and clutches, driving through worm gears to the travelling wheel shafts, the power take-off being taken from the lower of the two drums incorporated in the tripper frame. The power obtained in this way was sufficient to propel also the 24 ft. shuttle conveyor connected to the tripper by means of a draw bar and which could be rotated by means of a worm gear and chain drive so as to deliver material to either side, or in advance of the tripper. This shuttle conveyor was again 42 in. wide, 24 ft. centres, driven by a 7½ H. P. motor, flange mounted on to the gearbox of the conveyor drive.

For some reason which never became quite clear the use of these last two items was discontinued during the operation of the contract and the conveyor operated for considerable periods at a fixed length, material being spread from its self supporting jib by means of a bulldozer to promote a wider tip than is possible with any form of radial shuttle conveyor. To total amount of material excavated and conveyed by this conveyor system was of the order of 1 million tons.

### Working an Opencast Coal Site at Bolton-on-Dearne

Another opencast coal site near Barnsley is worked for the National Coal Board by the contractors John Laing & Sons Ltd. A Sutcliffe conveyor system was erected after the opening cut has been made. The equipment supplied consisted of three 42 inch wide Sutcliffe hoppers and a feeder hopper. The equipment was supplied in 1952 and the site is now worked out. The conveyors operated 20 hours per day handling from 1500 to 2000 tons per day. This is the story of the mechanical handling equipment used.

The installation at Bolton-on-Dearne, near Rotherham, was of a different character to that used on the previous installation although much of the equipment was interchangeable.

In this case the coal was excavated on a face 300 ft. long with an open cut about 80 ft. wide across the top and a little less than this across the bottom, the sides being comparatively steep due to the stronger nature of the strata. The conveyor installation was to be used to remove the top soil and more friable material and pass it over the cut at right angles to a central point where it could be spread by bulldozer on the 300 ft. face so that as one face advanced with the retraction of coal, the other similarly advanced by filling in from the back side.

The plant therefore consisted of a 42 inch conveyor 300 ft. long parallel with the cut to handle 400 tons per hour at a belt speed of 280 feet per minute, complete with fixed tail end, self supporting jib, hopper and feeder, exactly as supplied to the installation at Kexborough. (Fig. 6). The second unit, 250 ft. long crossed the cut by means of a bridge using the jib of an excavator as its base structure and connected at right angles to the third unit which was again 300 ft. long, which merely delivered material at a convenient spot ready for spreading by the bulldozer.

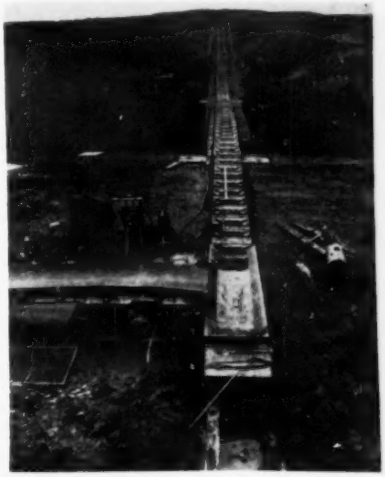


**Fig. 6 — Conveyor system under erection after opening cut has been made for stripping overburden at Bolton-on-Dearne.**

The belts were of 42 inch wide 6 ply construction, Grade B, 32 oz. duck with 3/32 inch top and 3/64 inch bottom covers. On this installation a 3 phase supply was available and it was therefore unnecessary to install a generating plant. (Fig. 7).

The contract proved to be an interesting one in one respect, despite its apparent simplicity, in that the 400 tons per hour proved to be well below the maximum rate

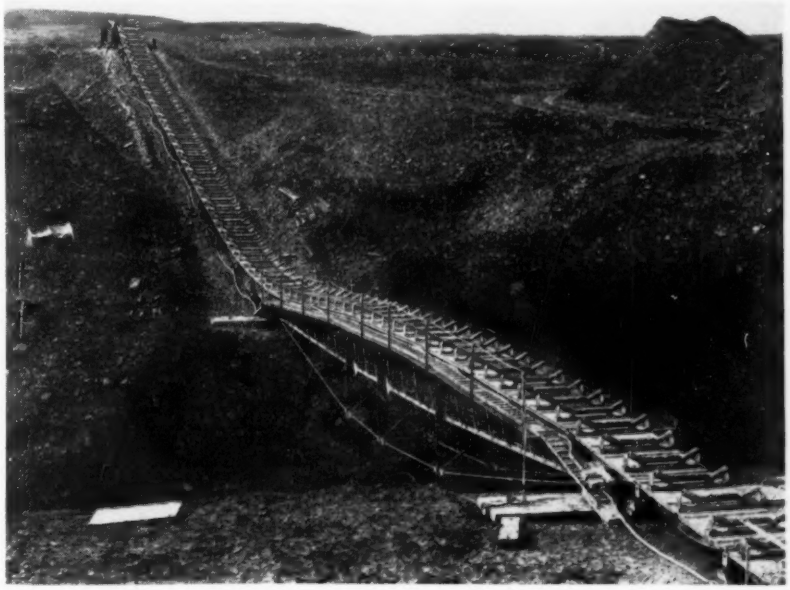
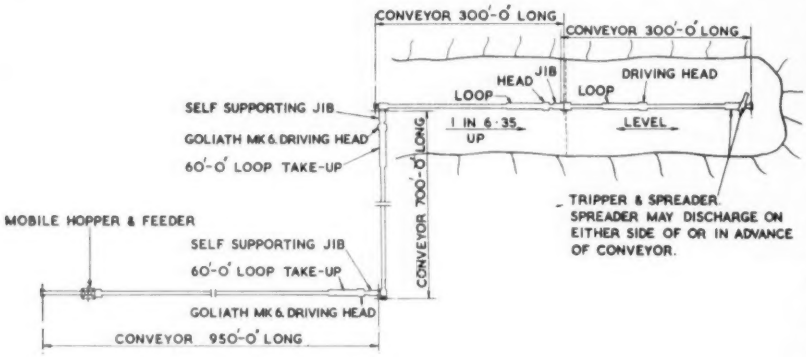


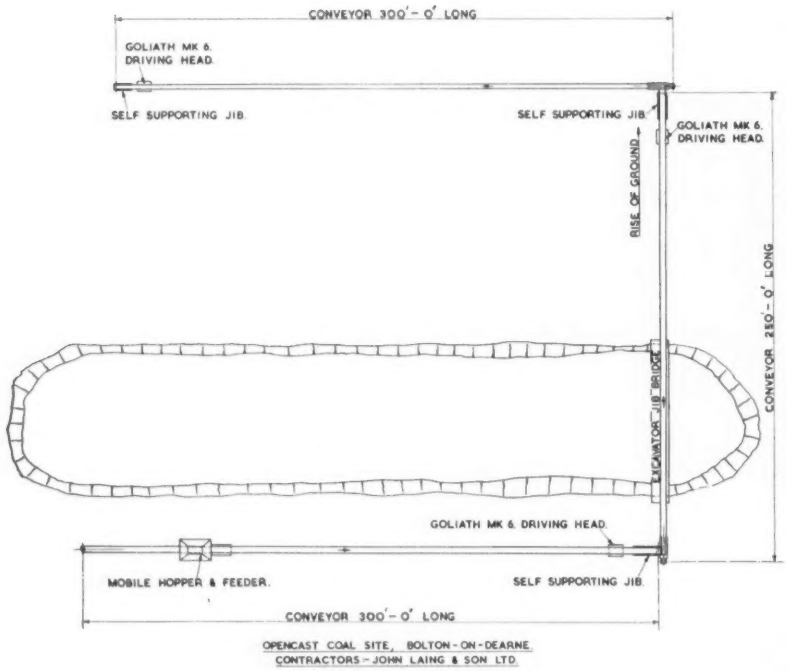
**Fig. 7 — Installation in progress.**

of handling and a final check on this proved that under certain conditions using 2-2¼ cubic yard buckets, peak loads for short periods could be maintained at the the flexibility of the systems this proved to be a little too much for rate of 690 tons per hour. Despite one of the motors which had to negotiate rising ground, and the existing motor which was of 45 h. p. was replaced by a 60 h. p. unit which comfortably maintained the enhanced load.

The writer is greatly indebted to Mr. H. Streets, Project Director of Richard Sutcliffe Ltd., of Wakefield, for data and illustrations. Acknowledgement is also due to the National Coal Board and to the contracting firms mentioned in the survey.




OPENCAST COAL SITE, KEXBOROUGH, NR. BARNSLEY.
CONTRACTORS:- MEARS BROS. LTD.




OPENCAST COAL SITE, BOLTON-ON-DEARNE.
CONTRACTORS - JOHN LAING & SON LTD.

● "Special Equipment for Allis-Chalmers Crawler Tractors and for Allis-Chalmers Motor Graders" is a new 12-page, two-color catalog (MS-1189) now available from the Construction Machinery Division, Allis-Chalmers Manufacturing Company, Milwaukee 1, Wis.

Pictured and explained are attachments and accessories Allis-Chalmers has available to increase the versatility and working capabilities of crawler tractors and motor graders, as well as add to operator comfort and safety under normal or unusual working conditions.

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● Virginia Coal Operators Association elected R. H. Hughes to serve as president at the annual meeting in Norton, Va. Mr. Hughes is president of Clinchfield Coal Co., Dante, Va. H. W. Meador, vice president of Stonega Coke & Coal Co., Big Stone Gap, Va., was elected vice president of the Association and E. H. Robinson was re-elected secretary-treasurer. Members of the board of directors elected by the membership include Messrs. Hughes and Meador, and John Mayhew, vice president of Blue Diamond Coal Co., Knoxville, Tenn., and J. B. Taggart, president of Wise Coal & Coke Co., Dorchester, Va. Thomas Howarth, secretary-assistant treasurer of NCA, was a guest at the meeting.

# Suppliers And Producers Of Ohio Golf Party

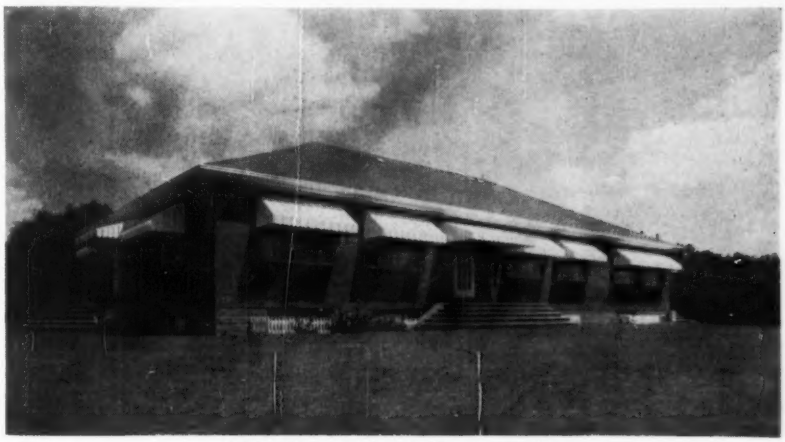
• Automated machinery seriously began to invade American industry more than 15 years ago. To this time not one underground face operation has been automated in the coal mining industry. Nor has any effective effort been made to train mining personnel to operate automated machines, by coal companies or by Colleges or Universities teaching mining courses.

It appears like the more management in the coal industry succeeds in relations with labor unions, the more educational and recreational facilities in mining communities improve, the more it loses that initiative of thought that made America great.

The inability of the coal industry to met its problem — in our kind of competitive enterprise that provides a rigorous test of efficiency — is constantly worsening. The most crucial point in the problem of solving our waning competitive position is the evolution of an economic standard of performance of automated machines. Solving of that problem will require greatly improved methods of mining, supervision by men trained in electronics, mathematics and the understanding of operations of automated machinery.

The coal mining industry will never be any better than the men who run it. Present managerial personnel cannot escape its share of responsibility for the bad competitive status of the industry. It is time the coal mining industry reexamine its value and its goals.

There is talent among the personnel of the coal mining industry as is demonstrated in the management of the Suppliers and Producers Golf Parties. If the coal industry ran its business as ingenuously as these parties are run, there would be more progress. This nonprofit group manages to issue chances on an almost unlimited number of prizes for the nominal fee charged for golf. If this group would add to its program a competant speaker on the subject of urgent needs of the industry, it would give the industry a much needed lift.

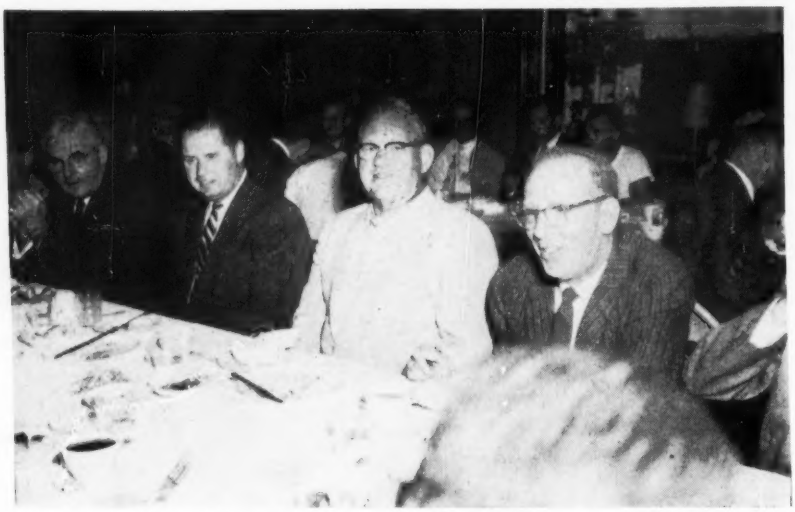


**Club House of Cadiz Country Club**

**R. W. Hatch, Hanna Coal Co., Pete Norris, Y & O Coal Co., B. O'Neil, Saturn Foundry & Machine Co., the directing personnel of the party.**

**Very fine assortment of golf prizes on display**

**Ford Sampson, Ohio Coal Assoc., Jim Reilly and Casey Harmon, Hanna Coal Co., R. M. Hannum, Manganese Steel Forge Co.**



**Left: James Hyslop, Hanna Coal Co., Walter Kuta, wire Rope Representative, U. S. Steel Corp., Pop Wernich, unattached, W. H. Powell, Industrial Rubber Products Co.**

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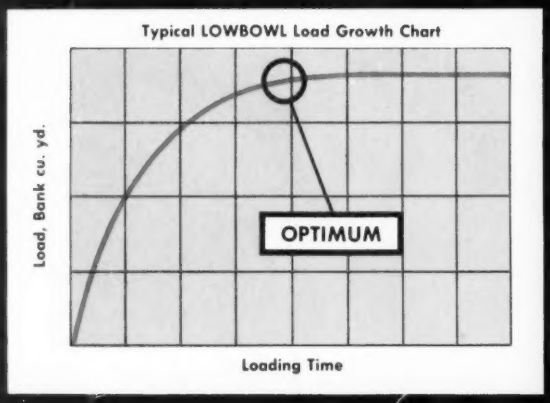


# You can prove CAT LOWBOWL SCRAPERS get bigger pay loads faster


## PROVE CAT

# Take a minute to test PAY LOAD PROFIT!

In just 60 seconds you can prove that the new Caterpillar LOWBOWL Scrapers now with increased capacity pay off—in faster loading and lower earthmoving costs! Here's all you do: hold a stop watch on a Cat Scraper in the cut. Time the load growth to the "optimum" point—when the most economical load is attained. Then run the rig onto scales and weigh the load to determine the *exact* amount being carried. (A LOWBOWL actually carries more than its appearance indicates.)

Now, do the same with any other type or make of scraper. You'll prove—like many contractors who have conducted this test—that Cat LOWBOWL Scrapers have greater loadability and more loading efficiency in any kind of material.

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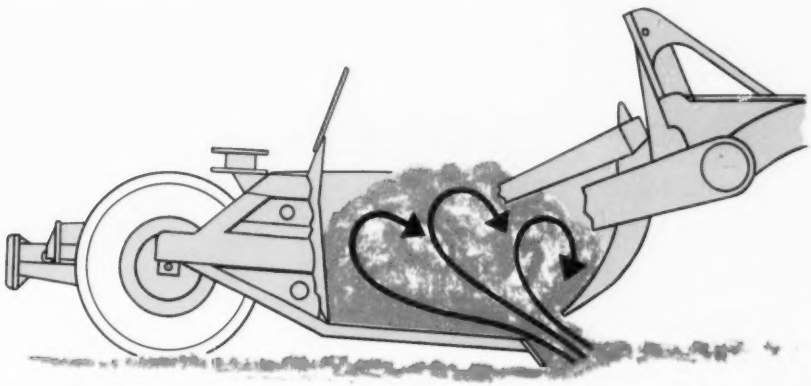
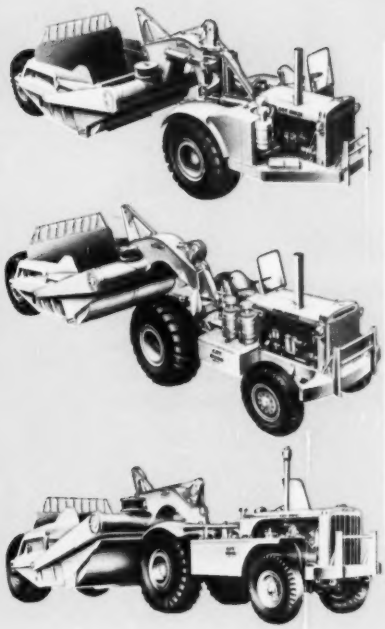
What's the secret of LOWBOWL success? It's more than low side sheets and a magic formula—every component of the scraper is engineered to do its specific job.

LOWBOWL design means you get *full* pay loads. Incoming material meets less resistance. And it "boils"—filling every corner of the bowl.

We're at your service to help you compare LOWBOWL *loadability*. We'll show you Cat LOWBOWL units in action—arrange for the scales—help you make an accurate analysis. Name the date—we'll demonstrate!





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H. Durett, J. C. Olzer, C. L. Sarfe, Manna Coal Co., Sheldon Jones, Hulburt Oil & Grease Co.

## NEW DUAL-PURPOSE LOADER DEVELOPED BY LONG COMPANY

● The Long Company, Oak Hill, W. Va., has added a dual-purpose loader to its line of Pigloader Loading Machines.

Designated as the Model 188-D, this new loader has all the features of the Long 88 series plus a specially designed swing boom that makes it the most versatile loader on the market. This swing boom is advantageous in working with Piggyback bridge conveyors as well as with shuttle cars, and if desired, the 188-D can be utilized with both on the same section.

According to the manufacturer, the operating height of the 188-D is only 25¾", thus making it the lowest, high-capacity loader in use today. Its flat digging angle and recessed digging arms permit lifting the counter-balanced head up to 10' off the bottom without the strokes of the arms exceeding the overall height of the machine — an important factor when considering actual working height. Its single 40 HP motor maintains speed and loading rate in even the toughest going.

The Long 188-D also offers advantages that materially reduce maintenance and down time. It has far fewer control and mechanical parts than ordinary loading machines —only one main speed reducer and only one motor and control. This simplified design means saving in spare parts inventory, easier maintenance, and less cost for upkeep of the machine.

Additional details on this new loader may be obtained by writing The Long Company, P. O. Box 331, Oak Hill, W. Va.

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● Mr. J. W. Dorff was named general superintendent of the Cannelton Coal & Coke Co. and the Lake Superior Coal Co. with headquarters at Cannelton, W. Va. Mr. R. L. Turner is now superintendent of the Cannelton mine and Mr. Naaman G. Clonch is superintendent of the Lake Superior mine.

# Automation Of Mine Haulage

By WILLIAM O. BARNARD — General Supt., Christopher Coal Co.

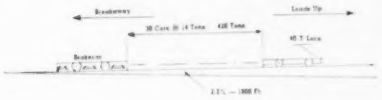
If you will study carefully your Looking in Webster's Dictionary, we find the following definition of Automation:

*Automation — Any automatic mechanism that imitates action of living beings.*

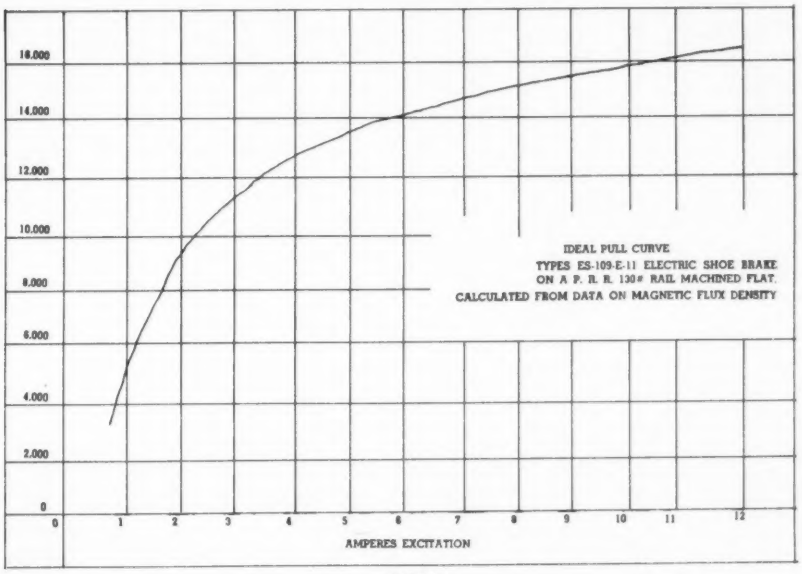
We, as coal people, are interested in applying automation to our mine operations where we can gain in safety, production, efficiency and cost. Some automation has already been applied to our mining operations. We have many automatic elevators for our portals, automatic dumps, automatic loading facilities and closed circuit television stations. Underground we have automatic pumps, fan and power signals, electric switches, block signal systems and we are working on the programing of continuous miner cycles. Some success has been made in remote control of a continuous miner and various other applications of automation.

inside operations, you will find most of the progress and advancement has been made in face production. We are all producing higher tonnage, more tons per man and better section costs than we have in the past. But let's take a look behind us — how much improvement have we made in our Material Handling? After all, that is our business — a black *material* called coal to be *handled* to its destination and supply materials to be delivered to proper places *where* they are needed; *when* they are needed and to supply only *what* is needed.

Certainly the easiest place to save a dollar today is from the face back. True, we have made some improvements in our material handling. We have bigger locomotives, which are equipped with air brakes, air sanders, air pole retractors, etc. We have better track with bigger rails. We have bigger mine cars and we have



made some use of belt conveyors, but our general method of handling material is much the same as it was 10 years ago.




ANNEX # 1

I read in the newspaper that scientists have sent an Inter-Continental Missile over 3000 miles and hit a small target. They can fly airplanes across the ocean by remote control, and soon they will probably put a man into space. In comparison to these feats of scientists, we have a very small problem. All we want to do is put coal a short distance to our preparation plants. We have tracks and headings to guide us and certainly no problem in space control, but I know of no complete automatic system yet.

On the subject of automation of Track Haulage, I would like to discuss one small phase and its successful application and operation. At the Arkwright Mine of Christopher Coal Company, we have used for several years an *Automatic Brakecar.*

In the analysis of our haulage problem in 1954, we had two 50-ton G. E. locomotoives on a mainline haulage of five miles. We were faced with installing an adidtional mainline haulage unit. Due to increasing the length of the mainline an additional two miles and additional tonnages, our old system would have required two aditional 50-ton locomotives to be used as a second mainline. In analysing our problem, we found that we were limited to 30 mine cars per trip due to physical location of our dump and storage yards. Also any additional surface land to expand suddenly became very valuable. We also could handle a 30 car trip with one 50-ton locoomotive. (Our mine cars are 8-wheel, 10-tons capacity.) All of our grades are against the loads. We have an average grade of

1.5% with maximum of 2.5% on the Arkwright Haulage. The power requirements on our rectifiers for two 50-ton locomotives together was 4400 amps and one 50-ton locomotive could bring the same trip much slower using 3200 amps and not be overloaded.

Therefore, our problem boiled down to needing a positive safety drag to prevent runaway trips. We knew of no drag that would hold 30 loads. We came up with the idea of an automatic brakecar.

You have all seen, I am sure, the magnetic brake shoe used on street cars in most of the big cities. They have them here in Pittsburgh. The brake shoe is simply a magnetic shoe which holds rail by magnetic force. We all studied in high school the magnetic flux action, so, why not hang a magnetic shie under a mine car. We noticed in an ad by Sanford-Day Iron Works that they had made a brakeman to help locomotives to brake on excessive grades. In discussing our idease with Sanford-Day Engineers, we could see no problem in our application.

Using a G. E. table, we were able to come up with some preliminary designs for an automatic brakecar. This table, of course, was for 130 lb. rails machined flat and we had 85 lb. rails which we could not assume were uniform. *(See Annex No. 1)*

Our first calculations may be found in *Annex 2.*

From these figures came our first Sanford-Day brakecar. This brakecar is essentially a mine car carrying, suspended on springs, six magnetic track brake shoes riding within 3/8" or less of the top of the rail. These shoes are pulled down to the rail by their own magnetism when energized by a 36 volt battery. The shoe itself, therefore, is an electrical magnet energized by a single coil. This car has been modified several times. A small differential mine car wheel was added to the front with springs to give more flexibility of the car wheels. We found the first design "too stiff." Also the boxes added to both ends were additional weight to keep the car on track when brake shoes were applied. This car had its batteries in a well in the middle of the car. There are four 8-volt batteries.

The car structure is designed to transfer the bumping stresses, but its weight of about five tons is independent of the braking effort. A centrifugal switch is mounted on the outside of the rear wheels. The shoes are applied by the centrifugal switch when car moves in a downhill direction. When the switch is in an operative position, a blue light indicates its position to the motorman. The tilted light in rear of the car is this blue light. We raised the light so motorman could see it from front of his 30 car trip. Also each car is equipped with a red light which serves as tail light on trip. To return brake car inside the mine, the centrifugal switch must be inactive.

After experimenting for over a year we came up with a new design. We tried the car under every possible condition — wet rails on outside, sand on rails, trips traveling at different rates of speed, and about everything we could think of.

The Sanford-Day Company manufactured another brakecar for us. This car is an 8-wheel car with six shoes and, with many changes from the design of the previous brakecar. Thanks to the maintenance foreman, shop foreman and several mechanics, we were able to make this second car very successful. Four of the magnetic brake shoes are suspended in trucks of the car. This gives a more positive action on curves and switches. We operate these cars on 250 ft. radius curves and have found that when brakes are applied on a curve, the car will go backwards around the curve until shoes come into contact with rail to stop trip. These cars will go any place that mine cars will go. The battery size was increased in these new cars to 12 volts and any three of the shoes will stop a 30 car trip; thus, we now have 100% safety factor. Again a red light and indicating light is used to show that the centrifugal switch is in operation. We also installed two centrifugal switches on these cars and they are set at slightly different speeds as

**Shown is a Model 4500 Manitowoc Shovel removing rock overburden so that a vein of coal can be loaded out into trucks by a smaller shovel. The 5½ yard machine is owned by R & E Coal Company and is working in their strip mine at Windber, Pennsylvania.**

added safety factor.

As mentioned above, this brakecar has six shoes — three on each side. Four of the shoes are built into trucks and middle shoes are still suspended in "possum belly."

One shoe is built into the truck itself. A good positive position is obtained to rail with shoes in between wheels of tracks. There is very little chance for shoe to miss complete contact with the rail.

The centrifugal switches are built up under truck. The frame of the truck protects the switch from pieces of slate, coal or any derailments that might occur. The switch is operated by a belt driven by the front wheels. As an added safety feature, there are two of these switches on each car and they are set at slightly different speeds to apply brake shoes, so that if one doesn't work the other switch will apply the shoes.

New heavy duty batteries are mounted on top of the car as height is no problem in our running seam. These four batteries can be changed as a unit. An extra unit of four batteries is carried as spare and are changed in a few minutes and the other unit can be recharged. These batteries are extra heavy duty 12 volt batteries and will hold 30 cars on a 2.3% grade for 30 minutes. We did some experimenting with charging batteries while brakecar was moving inside with 50-ton locomotive, but since we have found it only necessary to change batteries once per week. We have used a spare four battery unit and changed it out. We have a regularly scheduled inspection of cars, once each shift, before they are put into operation. Also under our present system, the brakes are applied after each trip in shifting cars and thus acts as a further check on brakecars.

In our operation at Arkwright Mine, we use three brakecars. Both motormen have a brakecar with them and the third car is left at the dump as it is changed by the dumper so that no delay occurs in picking up the empty trip with the brakecar for the return trip, inside. The use of brakecars has greatly reduced the pulling out of "jinny couplings" because one motor handles the trip and it is a much smoother operation than pusher and puller locomotives trying to work together.

By use of brakecars and running two 50-ton locomotives as separate mainline locomotives, we have been able to haul a total of 16 trips of 30 cars per trip, or a total of 480 cars a distance of seven miles (one way). This is for 10-ton mine cars —4800 tons of coal a distance of seven miles with two motormen.

The motormen were averaging 14 miles per hour for their complete shift.

BRAKECAR:

1. Consider 6 brake shoes on brakeman.

2. Brakes to be applied at 5 MPH or less in case of brakeaway.

3. Coefficient adhesion equals 25 per cent.

4. Pull per shoe against rail 15,600 x 6 equals 93,600 lbs. (6 shoes).

5. Factor of safety (assumed) .75 x 93,600 equals 70,000 pull.

6. Braking effort (3) x (5) equals 25% x 70,000 equals 17,500 pounds.

7. Grade effect of train—2.3 x 20 equals 46 lb./ton (Brgs.) equals 36 lbs./tons.

8. Tons car could handle equals 17,500 divided by 36 equals 485 tons.

9. Net tons car could handle equals 485 minus 6 tons (Br. car) equals approx. 480 tons.

10. Mine cars plus brakecar equals 420 plus 6 equals 426 tons.

11. Per cent theoretical braking 426 divided by 480 equals 89%.

**(Left) J. S. Fuller — (Right) Paul H. Davey**

● Davey Compressor Co., Kent, Ohio air compressor manufacturer, recently received a first place award plaque from the Cleveland Advertising Club.

This was in recognition of an outstanding advertising and promotional campaign in 1957-58. It was won in competition with 150 other national advertisers in Ohio, Western Pensylvania, Michigan and Western New York and was the second time Davey has been so honored in the past three years.

Paul H. Davey, Sr., chairman of the board, Davey Compressor Co., is shown receiving his award plaque from J. S. Fuller, plaque committee chairman.

COAL MINE INSTITUTE OF AMERICA

72nd ANNUAL MEETING

DECEMBER 11 & 12, 1958

PITTSBURGH, PENNA.

# Remote Control Of Continuous Mining Machines

By A. W. CALDER, Manager Loader and Continuous Miner Department,

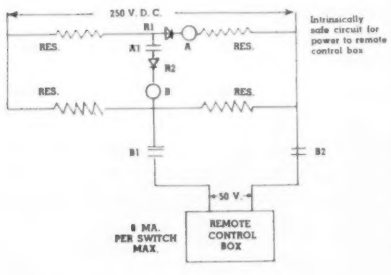
Joy Manufacturing Company

The eventual goal of remote control for continuous mining machines is to have the operator stationed in a safe place, pleasant area, possibly several thousand feet away from the machine. Sensing devices on the machine would transmit signals to the operator to allow him to steer the machine through the coal seam.

The development of this type of remote control system has been carried out by the Union Carbide Olefins Company, a division of the Union Carbide Corporation, with the successful operation of several machines working along a high wall. It was recently announced by Union Carbide and Joy Manufacturing Company that Joy would have these machines in general production within the next eighteen months to two years, with the possibility that the sensing devices and remote controls could possibly be adapted to underground continuous miners in the next 5 to 10 years. In the meantime, development work has been carried out on a less elaborate and more immediate remote control system which requires an operator to be within 50 or 100 ft. of the machine to guide it visually or audibly. This discussion shall be limited to the progress on development of close range remote control of underground continuous miners.

— 3 —

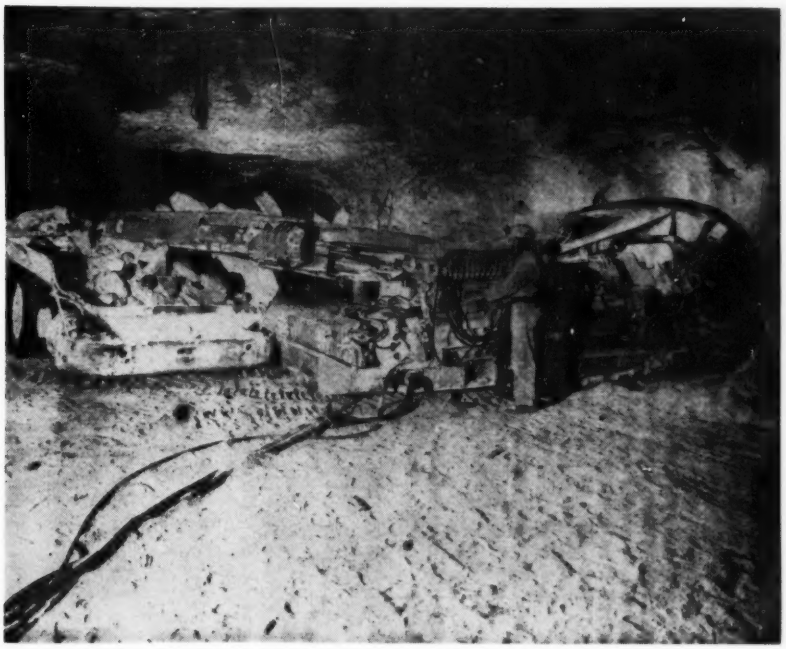
Figure 1




To utilize the full capacity of today's new mining machines, it is sometimes desirable to have the operator steer the machine from several different locations. This is particularly true when the machine is making turns or moving in narrow places. It is of even greater value, because it is safer, in pillaring operations or where questionable roof is encountered. With close range remote control, the operator could remain under supported roof 50 ft. or so from the continuous miner.

The requirements of an acceptable remote control system dictate the control box be small, light weight, simple to operate, and use dependable but rugged electric and hydraulic circuits not affected by stray currents in the mine. Our engineering investigations determined that solenoid operated valves, capable of handling the large oil flows for the boring machines, would not be practical because of size limitations and permissibility requirements. Therefore, the following system was developed: Low voltage switches on a small remote control box actuate electric relays which energize small solenoid hydraulic valves (¼ in. size). Oil from the small solenoid valve is used to operate the regular hydraulic valve on the machine by means of pilot cylinders. This arrangement permits a simple, compact design and does not require additional pumps or other auxiliary equipment on the continuous miner.

This permissible remote control system uses an intrinsically safe circuit for the switches in the remote control box. At no time will there ever be more than 50 volts potential in the remote control box. The electric circuit in Figure 1 shows the intrinsically safe circuit for the 250 volt remote control system. The rectifiers (R1 and R2) assure correct polarity. Relay A closes contacts A, which energizes relay B, which in turn closes con-



tracts B1, and B2, placing a potential of 50 volts in the control station. The various resistances are selected to control the voltage on the controls and thereby restrict their currents in the control switches to approximately 8 milliamps.

On the control box which weighs five pounds and controls all the functions of the machine, there is a large safe-off switch which stops the machine in case of an emergency. The fifteen (15) levers on the control station close or open the twenty-seven (27) light weight magnetic proximity switches. It is possible and we probably will reduce the size and weight of the control station approximately 25%. Since the conductor from the box to the machine could be damaged from abuse, it is equipped with connectors at each end to facilitate prompt replacement of cable.

A boring type continuous miner equipped with this remote control unit has been operating on an experimental machine in a New York state salt mine since the first of October. Since this is an experimental machine and not used for production, the unit has not been subjected to a full two months of normal operation use. Nevertheless, the experience to date indicates this is a practical control for use with mechanized mining. Figure 2 shows the operator at the machine with the control station laying on a tray at the conventional location for the machine controls. Figure 3 shows the operator with the control station about 20 ft. from the machine. This control station which was the *only* means to run this machine, has fifteen (15) levers which control every function on the machine. This includes starting and stopping the electric motors, tramming, and moving the various hydraulic cylinders used to raise or swing the conveyor, etc.

Remote controls for a full face miner such as the present day boring machine are relatively simple compared to those required for remote control of a ripper type continuous miner. If the operator is to be stationed at times up to 50 ft. from the ripper machine, it is necessary for the remote controls to also include means for an automatic cycling, since it is impractical for the operator to be present at the face for each cycle to determine the height of the shear cut.

It is reasonable to believe the components used for the remote control of the boring machine would be also satisfactory on the ripper machine. However, these must be supplemented with limit switches of some type on the machine to index the ripper bar as it completes each portion of a cycle. Since variable seam height and rolling bottom will vary the position of the shear cut, it will be necessary for the operator at his remote position to make occasional

adjustments to the stroke of the ripper bar for the shear cut.

The first attempt at an automatic cyclic control for a ripper machine was tried in 1949. It was not satisfactory because it did not reliably stop the ripper bar at the same position at the end of each shear cut and bar drop. In addition, variations in cutting speed, due to hardness of coal, condition of the bits and temperature of the oil, affected the dependability of this cyclic control. Any successful cyclic control cannot be affected by these factors nor by the general condition of the machine; therefore, means to actuate the automatic cyclic control must be coordinated to the position of the ripper bar.

An automatic cyclic device on ripper machines must have a unit which (1) will allow the ripper bar to cut a predetermined variable number of cycles across the face and stop at a selected room width, (2) permit adjustments to the height and drop of the ripper bar without being at the machine and (3) will not be affected by variations in seam hardness or machine conditions.

It would not be necessary for the operator to be near the machine at all times, since all controls including tramming and shear height variations would be on his automatic remote control box. It would be necessary, however, for him to be in the general area after the machine had finished cutting across the face and was ready to be advanced 24 inches to the next position. At this time (every 3 to 5 minutes) the operator could examine for changes in seam conditions and make any necessary adjustments in cutting height or room widths.

Several systems which meet the requirements established above appear to be practical for mining conditions and adaptation to ripper machines. It is difficult to reliably estimate when the program will be completed and the remote automatic control a reality. It may be six months, it may be longer. Nevertheless, where there is a requirement for a machine or new method, time has generally produced an answer.

Remote control of mining machines where the operator is in the immediate vicinity is a new development. But it is also a forward step toward developing a remote control and sensing device where the operator is located some distance from the immediate working area. The machine, not affected by operator fatigue and delays, would then be working nearer its true capacity.

**C. V. Fink & Son, Woodland, Penna., uses a Model 4500 Manitowoc dragline to remove rocky overburden in the process of uncovering a vein of coal. The 5½ yd. machine is working near New Garden, Penna.**

**Removing overburden of rock and earth so that a vein of coal can be mined is a Model 4500 Mantowoc dragline. The 6-yd. machine is owned by James Hoffman Coal Co. and is working in their strip mine at Pottersdale, Penna.**

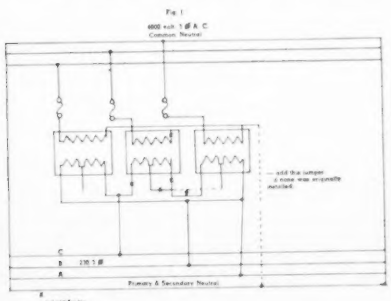
# Y Connected Transformer Bank Reduced By One

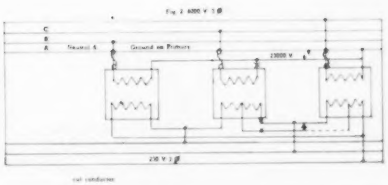
In many instances the mine operators own the substation in its entirity and the responsibility for maintaining service is 100% theirs. Having a series of spare transformers readily at hand at all times is the ambition of the average electrical cheif but is not always possible of achievement.

The Y connected transformer bank has won deserved popularity because of its versatility in service. The following techniques are recommended in the event of failure in one transformer. It has the approval of the standards committee.

A hypothetical case has the center member failing and due for removal. One opens the fuse indicated and makes the conductor opening by what ever method is least destructive of good material, such as disconnecting lugged connections, etc. The openings, of course, are all made prior to establishing new connections. The dotted lines indicate these!

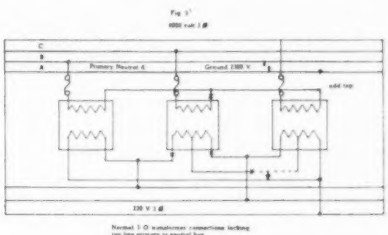
In the event of failure of either end members the procedure is the same. The voltage on each of the three transformer is 57.8% of the line voltage, but the current in each





transformer is the same as that in each line lead. This method of connecting in Y is on the safe side, since a ground on any one of the lines will short-circuit that line, blow the fuse or breaker and render the distribution inoperative, thus protecting the employess and greatly reducing the hazard of electrical fires.

If the transformers are connected in closed delta, and a unit fails, it is also speedily possible to cut out the defective unit and operate as opepn delta. The two units remaining are capable of 86.6% of the load, or 57.8% of all three transformers. With added fan cooling mine operation is carried on!



● Carlisle R. Slater has been promoted to manager of the Melrose Park (Illinois) Works of National Malleable and Steel Castings Company, it was announced today (Nov. 25) by Vice President Wilson H. Moriarty, general manager of the Railway Division.

Slater, 47, has been with National Malleable, one of the country's large independent foundries, since 1933 after his graduation from Case Institute of Technology, Cleveland. He was transferred from the Cleveland works to the Melrose Park plant, part of the Railway Division, in 1942, and has been at Melrose Park since that time. He was made general superintendent in 1954.

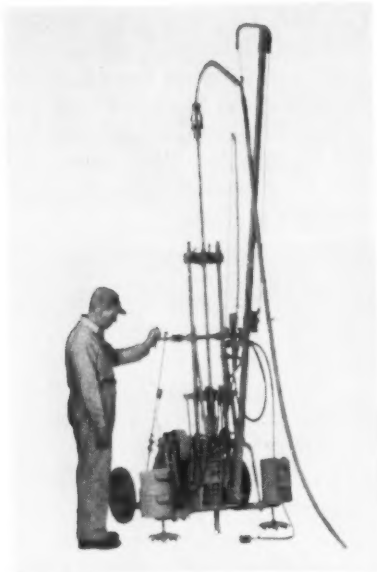
**Carlisle R. Slater**

He lives with his wife and three children at 1724 N. 77th Court, Elmwood Park, Illinois.

National Malleable, headquartered in Cleveland, has eight plants, and makes castings for the railroad, mining, automotive, marine and other industries.

● The election of Cloyd D. McDowell as president and treasurer has been announced by the Harlan County Coal Operators' Association at Harlan, Ky. For a little more than a year Mr. McDowell had served as secretary-treasurer, having succeeded the late George S. Ward in that post. Before that, Mr. McDowell was assistant secretary for six years.

# Hossfeld Drill Cuts Prospective Costs in Mining Operations



**Hossfeld Direct Motor Drive Prospecting Drill, Hossfeld Mfg. Co., Winona, Minn.**

Actual field runs prove that substantial savings in prospecting costs can be made and the element of chance in mining operations reduced with a Hossfeld Direct Motor Drive Prospecting Drill. It is now being widely used prospecting for coal, iron, valuable minerals, bauxite, clay and uranium. Hard and soft formations are drilled equally well, the only exception being rock of granite hardness. Using modern, screw-on, detachable rock bits in standard 1 in. thread, stock sizes from 1¾ in. to 2⅝ in. fit the Hossfeld drill steels. Holes can be drilled and samples taken continuously, and the light-weight compact and extremely portable machine easily moved to the next test drilling. By drilling more test holes and taking accurate samplings at frequent intervals over the prospecting area, a survey of the underlying strata, their depths and thicknesses can be made quickly, accurately and inexpensively. Cuttings and water are brought up through hollow drill steel by a bit check valve for continual assay at any depth, with little loss of water, cuttings or slitting. Accurate depth of formation and depth of ore body plus accurate samplings of underground deposits to a recommended depth of 110 feet are possible.

## "CHURN" PRINCIPLE OF -- OPERATION

Entirely automatic in operation, the Hossfeld Drill has a simple, direct motor drive transmission assuring years of trouble-free operation. The motor is mounted on a sliding base to permit taking up excess slack in the belt. A flat drive belt and idler serve as a clutch for starting and stopping the drill. Power is furnished by a 5 H. P., 4-cycle gasoline engine. The high speed reciprocating drill bit feeds itself, automatically, as fast as the material being drilled is cut away. The drill is also automatically rotated as it is being reciprocated so that the cutting bit never strikes twice in the same position. Hossfeld's "churn" principle, using water to slush the cuttings, makes it possible to drill through various strata of hard rock. Drilling speed varies with the formation, and carbide-tipped bits are recommended when drilling hard, abrasive material.

## COMPLETELY PORTABLE EASILY TRANSPORTED

"The Prospector's New Companion," the Hossfeld Drill can be trailed in the field on its own chassis, or behind a car, "Jeep" or truck. Or it can be folded into a half-ton pickup, or packed on a burro. Weighing 1,260 lbs. with counterweights it can be knocked down into 100 lb. units in minutes.

## QUARRY — TO COAL — TO CONCRETE—TO URANIUM

Originally designed for blast hole drilling in the pit and quarry field, the Hossfeld Prospecting Drill then shifted to the coal fields where it is used as a prospecting tool. The drill has also seen service in the highway construction field. It has been used for mud-jacking to reestablish road grades, and for testing footings for roads, bridges and buildings.

An illustrated bulletin "Take the guesswork out of Mining" may be had by writing:

Harold Richter
Sales Manager
Hossfeld Manufacturing Co.
Winona, Minnesota

● Cast in bold relief against a setting sun, the 578-foot long Liberian steamship "Andros Mariner" loads 20,826 tons of anthracite for France at the Port Richmond marine terminal of the Reading Railroad, in Philadelphia. It was the largest coal shipment in the 114-year history of the Delaware River facility. Shipment filled 348 railroad hopper cars; took 16 hours to load aboard the vessel. Figure at left near railroad is John W. Stewart, coal traffic manager of the Reading.

# Caterpillar News

● Application of a new technique for breaking coal seams has resulted in definite savings in cost per ton of coal removed from a Missouri bituminous mine. Reliance Mine of Peabody Coal Co., Clinton, Mo., has found that a tractor-mounted ripper used to fracture the coal not only costs less to operate, but works much faster than former methods.

Reliance Mine produces coal from a seam 30 inches thick. The pits average 65 to 80 feet in width. This mine is located in western Missouri. From 10 to 65 feet of clay overburden covers the seam at each of the Company's two pits. As there is little incidence of rock in the overburden, it is removed by a Lima 1250 30-yard dragline without blasting.

No blasting has been done at the mine for several years, since it was found that seams could be broken at a lower cost by a pinning machine. Pinning was standard in the pits until July, 1957, when it was decided to try a ripper as production tool. A Caterpillar D9 crawler Tractor with a Cat No. 9 rear-mounted Ripper was moved into the pit ahead of the loading operation. Through a trial and error method of experiment, a proper ripping pattern was developed, yielding the results the mine operators desired.

Reliance's pattern is based on 40-inch centers between parallel 100-foot furrows caused by the ripper tooth. Several passes on the 40-inch center are made, until the seam is ripped througout its entire width. On each pass, the tooth penetrates 27 inches; the tractor runs in second gear. In this seam, the hard coal is at the top and the tooth does not have to penetrate all the way to the bottom of the seam to achieve proper breakage. As the tooth passes through the seam, it causes many minute cracks between furrows, thoroughly shattering the coal throughout.

The pinning machine took an entire shift to break enough coal for a day's loading, but the D9 and ripper can do it in about an hour and a half. After the tractor has ripped sufficient tonnage in each pit for a day's loading, it is then free for general bulldozing work around the area for the rest of the seven-hour shift.

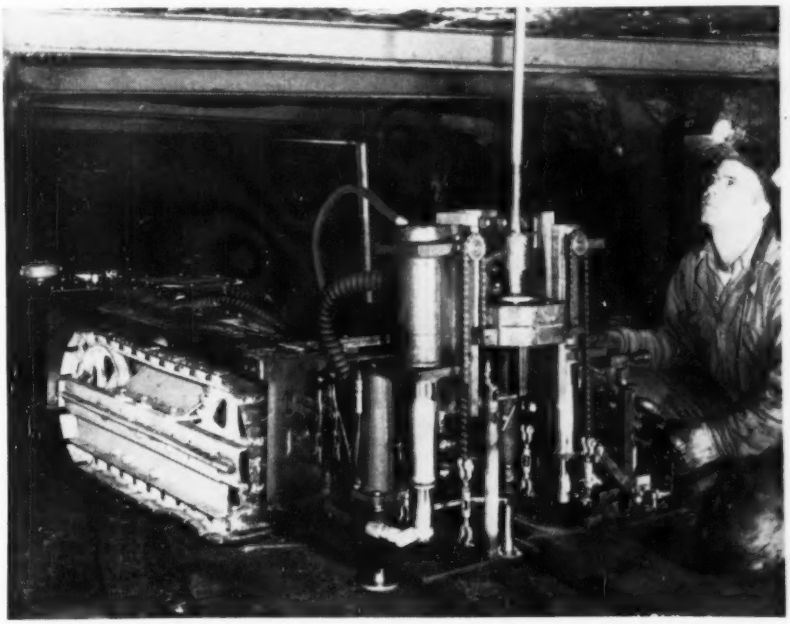
When the coal is ready to be loaded out, a 5-yard loading machine loads the coal into trucks for the short haul to the tipple. It is then processed and loaded into railroad cars for shipment to various industrial and utility customers.

Although the company has not yet determined exact savings per ton, it was realizing about 4½c per ton saving over blasting with the pinning machine, and the tractor-ripper is saving even more. Contributing factors to this cost reduction are the tractor's ability to get the ripping done quickly, then double on bulldozing work, and the fact that it only takes one man to operate the machine.

In operation, the company has found that the tractor-ripper produces more fines than pinning, but a corresponding reduction in the size of lumps results in less delay at the tipple. Outstanding benefit of the D9 and ripper is the speed in which the job is done.

Superintendent at the Reliance Mine is L. E. Scranton.

**Both horsepower and yardage have been increased on the LeTourneau-Westinghouse Model B Tournapull. Standard horsepower is now 335. Capacity is 21-yards struck, 28-yards heaped.**

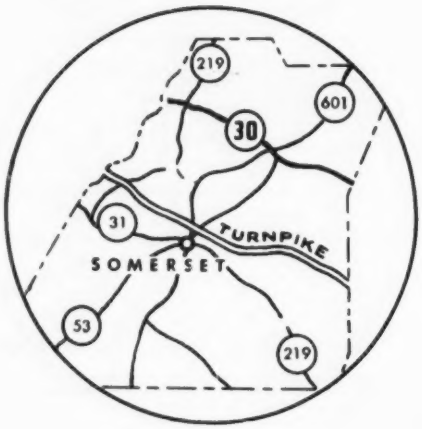


● RoofCat, the new hydraulic roof drilling machine for coal mines manufactured by Schroeder Brothers Corp., McKees Rocks, Pa., is shown here equipped with a "thru-steel" type dust collecting system. The machine, approved by the United States Bureau of Mines, is mounted on crawlers. Dust is sucked thru the opening of the hollow auger as the bit penetrates the roof, and is carried by rubber tubing to a dust collector.

● E. B. Leisenring, Jr., has been elected president of the Stonega Coke and Coal Co., of Philadelphia succeeding E. P. Humphrey. Mr. Leisenring was also elected executive vice president of the Westmoreland Coal Co., Westmoreland, Incorporated, and The Virginia Iron Coal and Coke Co., and vice president of General Coal Co.

Sixth in Beckwith's chain of convenient locations throughout Pennsylvania and West Virginia is this well-equipped parts and service center on Route 219 North of Somerset, about two miles from the heart of town.


# Beckwith Service Comes




Experienced equipment assistance . . . speedy, accurate Caterpillar repair work . . . efficient, fast Cat parts service—Beckwith Service is now available to earthmoving equipment users in the area surrounding Somerset, Pennsylvania. Many specialists who are waiting to serve you at Beckwith's Somerset headquarters are old friends of yours; others are new personnel who are anxious to earn your friendship. Stop in and inspect our facilities. Also remember that a call to Somerset 6533 will speed any of our men to your job or your office if we can be of service to you.

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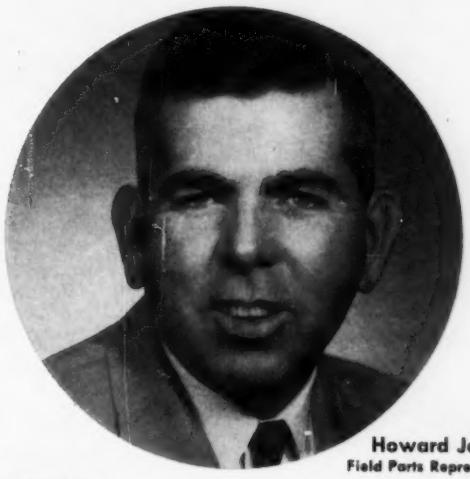
**Richard M. Rath**
Somerset Parts Manager

**Duane E. Jury**
Somerset Service Manager

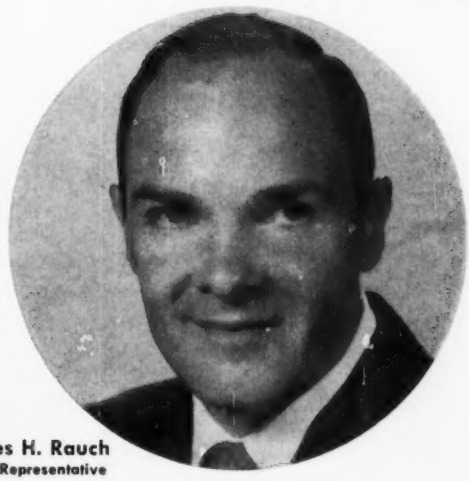
**Give this new Caterpillar service source a try. Call on us for equipment, parts or repair service. We'll show you that service is our business!**

...o Somerset Penna.



**Howard Jones**
Field Parts Representative

**Garrett and Allegany counties in Maryland; Mineral and Grant in West Virginia; Bedford, Blair, Somerset and Cambria in Pennsylvania are served from the new Somerset branch.**



**James H. Rauch**
Sales Representative

**Richard N. Welch**
Sales Representative

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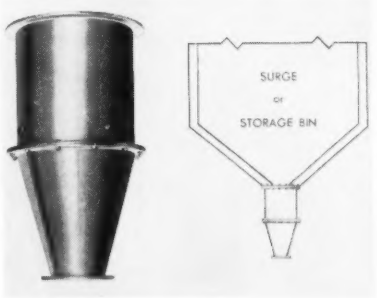
## ADVERTISER'S INDEX

JANUARY, 1959






● A device that regulates the outflow of coal and other bulk solids by gravity from bins and silos at speeds up to 7000 pounds a minute, has been announced by the Fairmont Machinery Company, Fairmont, West Virginia in special Bulletin BD958, just released.

Known as the Easy-Flo Bin Device, it can operate in conjunction with conveyors and feeders where it is particularly adapted for commercial plants and utilities with large storage facilities.

Heart of the device is a stainless steel double-cone element that automatically maintains material in an unpacked state once it passes by gravity from the bin into the device. Its outer shell is carbon steel. A low-pressure discharge outlet eliminates heavy duty gates and similar cut-off equipment.

Tests reveal that the device protects against dangers of rat-holing, arching and funneling.

The bulletin entitled "Fairmont-built Easy-Flo Bin Device" illustrates various applications with conveyors and feeders.

# *When is the right time to . . .*

**REBUILD** ?

**SWAP** ?

**REPLACE** ?


**There's a right time to do each.**
**Know when to Rebuild, Swap, Replace and you'll save money . . .**

# WHAT WOULD YOU DO?

## REBUILD?

## SWAP?

## REPLACE?

### Problem No. 1

You're master mechanic on a big dirt job with a tight time schedule. Your maintenance check indicates one of the Cat D9 Tractors will soon be going barefoot. There's some adjustment left in the tracks but you notice that the rollers look worn. You measure and discover they're worn down ⅜th of an inch. You know they can't be rebuilt safely after any more wear. The job superintendent, faced with a stiff penalty for delay, will scream his lungs out if you yank the big pusher out of the spread. But you've got to make the *right* decision *now*. What would you do?

### Problem No. 2

You own one Cat D6 Tractor and operate it yourself on small grading and site preparation jobs. It's mid-winter and you have a few weeks when there's no work to do, so you decide to fix the old girl up. The track links, you discover, are worn a little more than a quarter of an inch. The pins and bushings are almost gone, too. If you build up the links, you should get new pins and bushings at the same time. New pins and bushings mean track press time. What's the cheapest way to get your dozer in shape?

**Both Problems** have the same answer: call in a man who handles equipment problems like these every day.

Ohio Machinery's parts and service consultants know your Caterpillar earthmoving equipment... they've got the facts and figures on Caterpillar parts and repair costs... they know how to keep your Cat-built machines on the job at the lowest cost to you.

Here is the specific advice one of our consultants would have given to solve the two problems:

### Answer No. 1

OMCO's parts and service consultant would have advised the master mechanic to SWAP the worn rollers now. The badly-needed D9 pusher will be inactive only while the old rollers are removed and the rebuilt rollers installed—a matter of a few hours instead of precious days if you wait. The super will get more work out of the D9 and you'll save money by swapping parts.

### Answer No. 2

If you were the D6 owner, he would have examined those pins and bushings very carefully. If his findings indicated the pins and bushings would last the life of a rebuilding job on the rails, he would have advised you to have them welded up. Otherwise his advice would have been, "Buy a new track chain."

# HOW PARTS problems get solved

SIX TRAINED MEN are waiting to help you solve your parts and service problems. Get acquainted with the Ohio Machinery parts consultant in your area soon... his personal attention will save you time and money. He's on call near your job to help you get the most out of your Caterpillar equipment.

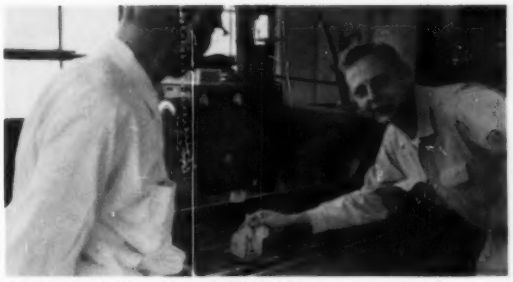
***...another Ohio Machinery Co. service to help you build bigger profits.***

**TESTING** a Caterpillar owner's lube oil filter, Dick Hall adds dirt to the filter tester. When his tests are completed, the machine owner will know the filtering capacity of his element and how well it protects vital engine parts. Dick Hall performs this and other services for customers in the eastern Cleveland area. Call him at our **Cleveland office LAfayette 4-2911.**

**ADVICE** on when to rebuild track links and other undercarriage parts is offered by Parts Consultant Cal Clark to Forrest Sanders, Tuscarawas County contractor. Clark, using a track wear gauge on one of Sander's D7's, was one of Ohio Machinery's top field servicemen before becoming a parts and service consultant. Caterpillar owners in southeastern Ohio can reach Cal at our **Cadiz office . Phone 465.**

**STOCK RECORDS** are always a problem for fleet owners. Parts Consultant John Mahnen gives Joe Huff of the J. A. Jones Construction Co. advice on setting up an inventory control system. The six parts and service consultants work constantly with Ohio Machinery's parts inventory control and can help Caterpillar owners organize their own system. If you work in western Ohio, you can contact John Mahnen at our **Toledo office . . . . . JEfferson 6-3701.**

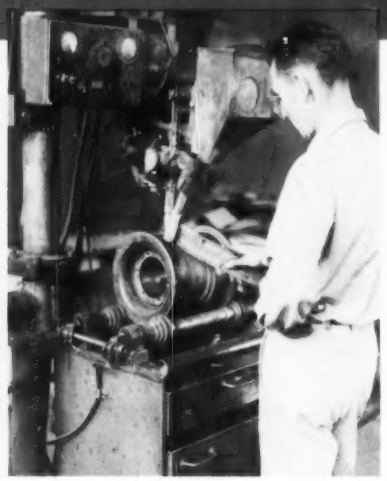
**HOW FAST** scraper cutting edges wear is measured by Parts Consultant Charlie Haberkorn. He's using a portable Rockwell Hardness Tester to determine whether the hardened area on this genuine Cat cutting edge has worn away. This test was made for Contractor Harry Miller. Charlie Haberkorn performs many services like this for contractors in the Youngstown area. He can be reached at our **Youngstown office . . . . . STerling 2-8161.**



**SERVICE FOLLOW THROUGH** is a parts and service consultant responsibility. Here Ron Brockway confers with Shop Foreman John Dechert on a rail welding job for a customer's machine. The machinery know-how of OMCO's parts consultants—Brockway is a graduate metallurgist, for example—pays off in sound advice and time and money saved for Ohio Machinery customers. Central Ohio Caterpillar owners can call Ron Brockway at our **Columbus office HUdson 8-9703.**

**SPECIAL PROBLEMS** of Caterpillar owners are carried to top management of Ohio Machinery if your parts and service consultant can't answer your questions. Here Consultant Jim Clemens talks over the addition of parts to Ohio Machinery stock with General Parts Manager Joe Hulsman. Helping insure that we have parts when you need them is only one phase of Jim Clemens' job. Caterpillar owners in the western Cleveland area can call him at our **Cleveland office . . . . . LAfayette 4-2911.**

# *ASK* Your Parts and Service Consultant to Recommend One of these OHIO MACHINERY CO. Services



**REBUILD** Rollers, idlers, links can be rebuilt economically in our shops on a production basis with up-to-date welding machines. Special repair equipment for Caterpillar machines and 103 skilled mechanics enable us to handle any rebuilding job—large or small. All service work and parts are guaranteed.

**SWAP** You'll save time and money with Ohio Machinery's Parts SWAP Plan. When a part or assembly on your Caterpillar machine needs replacing—and is covered in the growing list of SWAP items, bring it to us. Your Parts Consultant will give you a complete list of SWAP items including prices.

**REPLACE** Our electronic recording system gives us a constant analysis of the parts replacement needs of Ohio Contractors. You're assured of parts when you need them by Ohio Machinery's $1,750,000 stock of genuine Cat parts—the best down-time insurance possible.

# OHIO MACHINERY CO.

***Your Caterpillar Dealer***

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## *Check* undercarriage wear yourself accurately

Please send me a free wear gauge

*Name* _____

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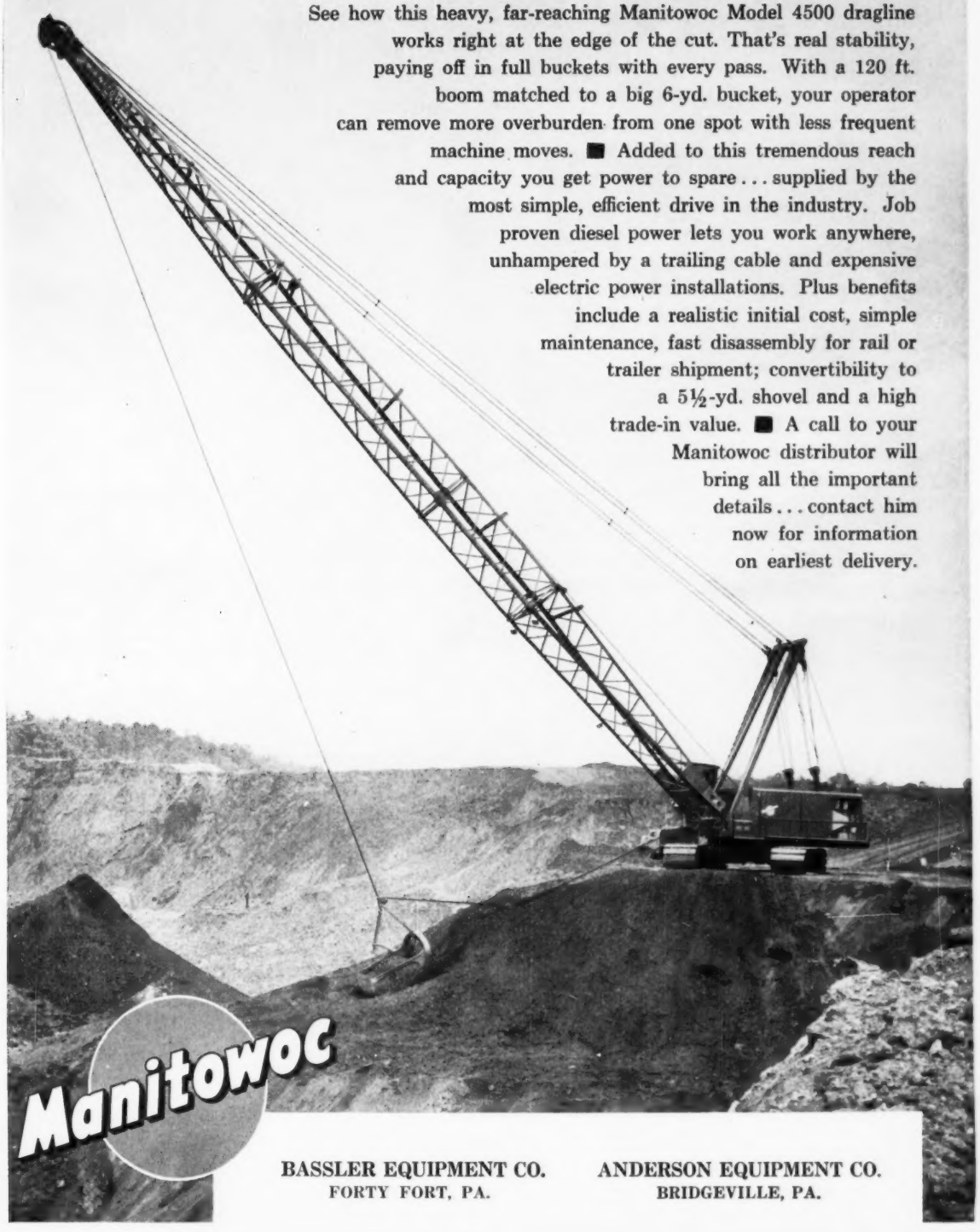
*City* _____

*Machine owned* _____


**Send for this free precision wear gauge ...die cut aluminum, completely accurate**

# Nothing fits **STRIP MINING** like this fast, mobile 6-yd. *diesel-powered* **MANITOWOC!**



See how this heavy, far-reaching Manitowoc Model 4500 dragline works right at the edge of the cut. That's real stability, paying off in full buckets with every pass. With a 120 ft. boom matched to a big 6-yd. bucket, your operator can remove more overburden from one spot with less frequent machine moves. ■ Added to this tremendous reach and capacity you get power to spare . . . supplied by the most simple, efficient drive in the industry. Job proven diesel power lets you work anywhere, unhampered by a trailing cable and expensive electric power installations. Plus benefits include a realistic initial cost, simple maintenance, fast disassembly for rail or trailer shipment; convertibility to a 5½-yd. shovel and a high trade-in value. ■ A call to your Manitowoc distributor will bring all the important details . . . contact him now for information on earliest delivery.

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Highway service crew, Pittsburgh. Ernie Sarver, shop superintendent, is in center front.

Pittsburgh parts department staff. Al Bischoff, parts manager, is in center front.

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***Parts and Service*** **are of first importance on every job.**

**And—one of the big reasons why more and more leading contractors and mine operators depend on Highway for *all their equipment needs,* is Highway's superior parts and service.**

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